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An Experiment in Cooperative Research

JOHN S. COLEMAN AND ERIC A. WALKER

Committee on Undersea Warfare

DURING the past summer months, the Committee on undersea warfare of the National Research Council joined with the U. S. Navy Electronics Laboratory in organizing and initiating a cooperative research program in San Diego, California. Because of the current interest of most non-government scientists and engineers in methods of contributing their skills and experience effectively to the recently intensified defense research effort, the editors of NEWS REPORT asked the Committee to prepare this brief report on the more significant aspects of the organization, conduct, and results of this program.

There were two major objectives in establishing the joint summer project of 1951. The first was to make a concentrated attack upon an important technical problem facing the Navy, and the second was to develop a procedure whereby the advice and assistance of a group of visiting scientists could contribute effectively to the program of an established government laboratory.

The Undersea Warfare Committee had received a request from the Office of Naval Research to make recommendations on certain classified devices. Responsibility for a number of instrumental components had been assigned to the Navy Electronics Laboratory by the Bureau of Ships. The whole problem was one of the most important facing the Navy, and a directive from the Chief of Naval Operations gave the necessary priority to launch the intensive technical program required for its solution. The sympathetic attitudes of the Navy Electronics Laboratory and the National Research Council group, as well as other qualifications, made them particularly well adapted to undertake jointly certain analytical and experimental phases of the work envisaged.

After the last war, the armed services established a number of large research laboratories; some were new and others were based in part on former organizations of the Office of Scientific Research and Development. The Navy Electronics Laboratory grew out of the U. S. Navy Radio and Sound Laboratory and the Division of War Research of the University of California. Since 1945, the Laboratory has settled into a more formal pattern of operation than that which characterized establishments of the Office of Scientific Research and Development.

The Korean War added emphasis to our defense effort and called for an accelerated research program. There are some scientists who feel that the only solution is new laboratories operating outside the Department of Defense, or at least organizations which have been freed from all but the most elementary type of restrictions.

Neither the Navy Electronics Laboratory nor the Committee on Undersea Warfare shared this view. These two organizations believed that by working together on a short-term basis new effort and new inspiration could be summoned. The association of an auxiliary group of scientists with an established laboratory offered great advantages in reducing the time necessary to initiate increased effort, in employing effectively the extensive facilities already available, and in assuring continuity of the work and carry-over into equipment and use.

The first active step was the formulation of a program and a detailed plan of attack which would make maximum use of the skills and facilities available. A team of principals, drawn from both the professional staff of the Laboratory and the group organized by the Committee, was assembled. This team spent the first week of May together without interruption, analyzing the essentials of the problem and weighing the most promising of the many possible methods of attack. When agreement was reached, detailed consideration was given next to the availability of instruments and facilities which would be required to carry out the proposed program of measurements and experimental inquiry. The Navy delegates carried these requirements back to San Diego, where immediate steps were taken to assemble and calibrate the necessary apparatus. Meanwhile, the proposed plan of attack was consolidated and offered to the Navy and to the members of the annual Symposium on Undersea Warfare for comment and approval.

To carry out its share of the project, the Committee on Undersea Warfare agreed to supply a group of "working" research men who for a two- or three-month period would work at the Navy Electronics Laboratory and be assimilated temporarily into its organization. The group was recruited from eighteen organizations and was made up of men capable of independent research. A special effort was made to secure representation from other government or contract activities which might be expected to continue portions of the program at the conclusion of the summer. About half of the group came from such sources.

Although special attention was paid to the heart of the problem which related to detection, it was recognized at the outset that solution of the total problem was dependent upon a carefully integrated systems concept because of the marginal nature of many of the components. Thus, six major and several minor experimental groups were organized, only three of which were concerned with the evolution of a satisfactory detector. Coordination and determination of intra-system requirements were undertaken by a small planning staff under the leadership of Gaylord P. Harnwell, University of Pennsylvania. In conducting the program, the emphasis was placed on securing fundamental measurements and data which would provide primary decisions on ideal designs and operating techniques rather than on evaluations of particular configurations.

By June 15, when the first members of the group arrived, desk and laboratory space were available for the visitors, and organizational details—passes, security, secretarial assistance, and, in most cases, housing—had been solved through the efforts of the Navy Laboratory which assigned a senior Naval officer with authority to call upon all Laboratory resources for assistance. By the end of the month, practically all of the group had arrived and were busy with the final assembling and calibration of apparatus. In all cases, the visitors were assigned to appropriate existing Laboratory groups instead of being concentrated under a single roof. The operation might be described as a local infiltration, rather than an invasion. Coordination and guidance were effected by a series of weekly seminars attended equally by both the Laboratory staff and the visitors. These meetings provided an opportunity to describe objectives, to report progress and to identify and relate these to a common, mutually supporting plan.

This cooperative venture worked remarkably well. The administrative arrangements went very smoothly and a substantial beginning was made on the problem. The Navy Laboratory scientists participated in formulating the recommendations of the final reports and much of the experimental program was transferred completely to the

Laboratory with little loss of continuity. Furthermore, the work revealed those factors which are important in designing a reliable high-performance system and opened up several avenues to be followed in developing specific detection equipment.

A pattern of operation was established which could well form the basis for future activities of a similar nature. An important factor in the success of the work was the high priority that it carried, because this enlisted scientific personnel of the highest quality and justified the inevitable delays occasioned to certain other programs within the Laboratory. While the experience gained during these months suggests several ways in which the group could have been more effective, especially in providing a somewhat longer period for planning and preparing apparatus, it is believed that the experiment in cooperative research was highly successful, and that it might be repeated profitably by other service laboratories in other fields of science.

SCIENCE NEWS

AUTUMN MEETING NATIONAL ACADEMY OF SCIENCES

The 174th meeting of the National Academy of Sciences was held on November 5, 6, and 7 at Yale University in New Haven, Connecticut. Members of the National Academy and their guests were cordially received by the University community and enjoyed the informal and friendly atmosphere which prevailed on the campus.

The Local Committee on Arrangements, headed by E. W. Sinnott, Dean of the Graduate School, had prepared a well-balanced program. Papers presented at the scientific sessions covered such a wide range of disciplines that the meeting as a whole constituted an eloquent exposition of the vastness and complexity of present scientific frontiers. Audiences were invited on one occasion to measure atomic diameters and on another to reflect upon the dimensions of three galaxies. There were communications on such varied topics as crustal deformations of the earth, the molecular structure of societies, the thermodynamics of peptide hydrolysis, problems of magnetism, and transistor electronics.

At the evening public lecture entitled "The Microstructure of Living Cells and Their Constituents," Francis O. Schmitt presented evidence to show that cells are able, by creating the proper equilibrium in their environment, to bring about the deposit of elaborately structured fibrous protein material as though by crystal formation. Once the appropriate biochemical adjustments are achieved, morphologically complex patterns appear to be automatically established, and the patterns, which differ according to slightly different equilibria reached, tend to be consistently repeated.

Although the three-day program was devoted primarily to scientific sessions, social occasions were included. A smoker for members of the Academy was held on the first evening in the faculty lounge in the Hall of Graduate Studies. On the afternoon of the second day, following visits to points of interest in and about the University, President and Mrs. Griswold entertained members of the Academy and their guests at a reception in the Yale Art Gallery. That evening the group assembled at the New Haven Lawn Club for the Academy dinner.

Following the dinner, President Bronk, in his role as toastmaster, asked Professor William F. Durand, Academy member since 1917, to receive a rising vote of tribute for his long service to science and to the Academy. Dr. Bronk then called upon President Griswold to deliver the address of the evening. Speaking informally, President Griswold discussed humanism and science in respect to problems facing universities today. He expressed

a guarded optimism and yet an intuitive confidence in the capacity of youth to meet the many perplexing challenges of our times.

Sir Henry Tizard of the Royal Society of London, who was a guest of the Academy at the dinner, spoke briefly on the common origins of studies in humanism and science in the sixteenth century and expressed gratitude over British and American cooperation in scientific endeavors.

In the absence of Lee A. Dubridge, Chairman of the Committee for the Marcellus Hartley Fund, Oliver E. Buckley announced that David E. Lilienthal had been selected to receive the Marcellus Hartley Award for eminence in the application of science to public service. Dr. Buckley read the citation which recorded the major achievements of Mr. Lilienthal. Following the presentation of the medal by President Bronk, Mr. Lilienthal responded extemporaneously. He said that in spite of falterings and reversals there was a discernible social progress over the world in terms of individual freedom and liberty. It was true, he believed, after careful reflection on the question, that science had played an essentially favorable role in regard to social progress in spite of the fact that science had developed instruments whereby greater numbers of people could be dominated by an ever smaller but more powerful group.

In recognition of the 250th anniversary of the founding of Yale College, President Bronk, on behalf of the National Academy of Sciences, presented to Yale University, through Dr. Griswold, a gravure facsimile of the first pages of the original signature book of the Academy. This framed document displayed the signatures of the incorporators of the Academy, nine of whom were graduates of Yale.

SWEDISH SCIENTIST IN LECTURE SERIES

Professor Ragnar Granit, Director of the Nobel Institute for Neurophysiology, Stockholm, Sweden, was guest speaker on the Academy–Council lecture series, Thursday afternoon, November 1. Professor Granit spoke on "The Retina and Color Vision." Tea was served in the auditorium following the lecture.

A ROYAL VISITOR

Philip Mountbatten, Duke of Edinburgh and President of the British Association for the Advancement of Science, visited the National Academy of Sciences on November 2. The occasion was marked by an informal reception at which members of the Academy and invited guests were privileged to meet and visit with the young man, who, by his own wish, has assumed an active role in the promotion of science in his country. Flags of Canada, Great Britain, and the United States brightened the auditorium of the Academy–Council Building in which the reception was held. The freely swinging Foucault Pendulum, which occupies the central position in the auditorium, was in operation in honor of the occasion.

Before leaving the Academy to join Princess Elizabeth at Blair House, the Duke of Edinburgh was invited by President Bronk to sign the Visitor's Book of the National Academy. The first page of this illuminated volume now carries the inscription "Philip November 2, 1951."

NEW DIVISION CHAIRMAN

The appointment of Paul Weiss, Professor of Zoology at the University of Chicago, as Chairman of the Division of Biology of the National Research Council has been announced by Detlev W. Bronk, President of the Academy. Dr. Weiss assumed his duties on the first of November, succeeding Ralph E. Cleland, Dean of the Graduate School and head of the Department of Botany, Indiana University, who has served as Chairman of the Division for the past three years.

Dr. Weiss is not a newcomer to Academy–Council activities. He is chairman of the Merck Fellowship Board, chairman of the Committee on Neurobiology, and until recently was a member of the Committee on International Exchange of Persons which assists the Department of State in the selection of candidates for Fulbright Awards. He organized the new Committee on Developmental Biology and now serves as its chairman.

During World War II, Dr. Weiss directed an important project on nerve repair con-

ducted under the joint auspices of the Office of Scientific Research and Development and the Surgeon General of the Army. For his outstanding services in connection with this assignment he received the Army–Navy Citation of Merit. In 1949 he received the honorary M.D. degree from the University of Frankfurt, and in 1951 he was elected to membership in the Swedish Royal Academy of Science.

Dr. Weiss is well known for his basic analytical studies on the mechanics of growth and differentiation of the nervous system, on the functional properties of nerve, and on nerve regeneration. He is a member of the National Academy of Sciences.

HIGHWAY RESEARCH BOARD

The appointment of Fred Burggraf as Director of the Highway Research Board has been announced by the Chairman of the National Research Council. Mr. Burggraf succeeds the late Roy W. Crum, who occupied the post from 1925 until his death in May of this year.

Mr. Burggraf has been connected with research relating to highways since 1919. In the course of his career, he has been associated with the National Bureau of Standards, the Illinois Division of Highways, and the Calcium Chloride Association. He served as Research Engineer of the Highway Research Board from 1928 to 1932 and returned to the Board as Assistant Director in 1940. He was named Associate Director in 1945.

FOOD PROTECTION COMMITTEE

Two new releases, "A Statement on the Use of Surface Active Agents in Foods" and "Use of Chemical Additives in Foods," have been prepared by the Food Protection Committee and are now available for distribution. Other publications currently in preparation by the Committee include a bibliography of chemical methods; a list of chemicals used; a classification system for data collected; a compilation of chemical, entomological, toxicological, and other data on pesticides for publication in brief form; and a statement on the technological and nutritional justification for the use of additives in foods.

DEVELOPMENTAL BIOLOGY

The Committee on Developmental Biology, recently established by the Division of Biology and Agriculture, will study problems in the field of embryology, growth, differentiation, and regeneration, including cytological, biophysical, and biochemical foundations.

Teaching and research in this area have been dispersed through many biological disciplines from anthropology to zoology, and one of the first activities of the Committee will be to bring into focus the central object of development rather than the various biological forms previously studied. Since the problems of development have wide practical applications to agriculture, medicine, sanitation, psychology, and sociology, the Committee will serve as a liaison agency to bring these varied interests together. The Committee also will make a survey of the field to determine underdeveloped areas in need of special support.

A grant from the Rockefeller Foundation enables the Committee to carry out its preliminary organizational and survey functions by arranging informal conferences which will bring out the present state and future needs in developmental biology.

Membership of the Committee on Developmental Biology was reported in Vol. 1, No. 3 of NEWS REPORT.

CONFERENCE ON ELECTRICAL INSULATION

The annual Conference on Electrical Insulation of the National Research Council was held at the National Bureau of Standards, November 29–31, with the largest attendance in its history. About 350 persons registered for the meeting. The technical sessions were devoted to the following topics: *a*) Dielectric Measurements, *b*) Insulation Applications, and *c*) Dielectric Properties of Matter.

Round-table discussions were held each afternoon on requirements and prospects for improved dielectrics, service performance of insulation for electrical equipment, dielectric measurements, recent advances in ceramics and glasses for electrical insulation purposes, insulating materials for use at elevated temperatures, ferroelectrics and electrets, fundamental properties of

dielectrics, service performance of wire and cable insulation, and biological deterioration of insulating materials.

The following officers were selected to organize the 1952 Conference: A. von Hippel, Massachusetts Institute of Technology, *Chairman;* D. W. Kitchin, Simplex Wire and Cable Co., *Vice-Chairman;* and A. J. Warner, Federal Telecommunication Laboratories, Inc., *Secretary.*

IMPROVED TECHNIQUES FOR MINERAL DISCOVERY

Pursuant to a request from the President's Materials Policy Commission, the Division of Physical Sciences assembled a panel of representative scientists to survey the subject and prepare a report on the Possibilities of Improved Discovery Techniques in the Minerals Field.

Members of the panel were John N. Adkins, Office of Naval Research, *Chairman;* Louis H. Ahrens, Massachusetts Institute of Technology; Ernst Cloos, Johns Hopkins University; Herbert E. Hawkes, U. S. Geological Survey; Ellis A. Johnson, Operations Research Office; George C. Kennedy, Harvard University; Arthur C. Lundahl, U. S. Naval Photographic Interpretation Center; Judson Mead, Indiana University; and Morris M. Slotnick, Humble Oil and Refining Co.

The panel began its work early in October and submitted a final report to the Commission on November 15, 1951. The report was developed and prepared under the following headings: Geochemical Investigations of Ore Deposits, Trace Analysis in Mineral Prospecting, Aerial Photography in Mineral Discovery, Drilling Technology, Geophysical Prospecting for Minerals, and Geophysical Exploration for Petroleum and the Mining Industry.

STERILIZATION OF BLOOD AND PLASMA

Basic concepts concerning methods of sterilization of blood and plasma are being examined by a new committee of the Division of Medical Sciences. At the present time ultra-violet light irradiation is used for the inactivation of hepatitis virus in plasma. There is no method for the virus sterilization of whole blood.

At the first meeting of the Committee, progress reports were given by investigators engaged in the study of different methods of sterilization. As a result of this general review of research, the activities of the Committee are proceeding along several lines. In the chemical field, two compounds, B-Propiolactone and sulfur mustard, are being carefully evaluated as to toxicity before testing their effectiveness against hepatitis virus. A re-evaluation will be made of the alterations in the components of plasma induced by high levels of ultra-violet and cathode-ray energy. Through these and other studies, it is hoped that a better understanding will be gained of the basic principles which are involved in the inactivation of hepatitis virus in blood and plasma.

NEW DIVISION APPOINTMENTS

William N. Fenton, for the past twelve years ethnologist on the staff of the Smithsonian Institution, has been named the first Executive Secretary of the Division of Anthropology and Psychology of the National Research Council. Dr. Fenton will assume his new duties on January 1, 1952.

Prior to his connection with the Smithsonian Institution, Dr. Fenton served with the U. S. Indian Service and taught sociology and anthropology at St. Lawrence University. During World War II, he served as secretary of the Smithsonian War Committee, was a research associate of the Ethnogeographic Board in charge of the World File of Area and Language Specialists, and made a survey of area studies in American universities. He is a member and past president of the Anthropological Society of Washington and a former editor of the *Journal of the Washington Academy of Sciences.*

Gordon L. Bushey, until recently Assistant Professor in the Division of Inorganic Chemistry at the University of Illinois, has been appointed Executive Officer of the Division of Chemistry and Chemical Technology, of the National Research Council.

Dr. Bushey graduated from The Rice Institute, Houston, Texas, in 1943 and received the Ph.D. degree in chemical engineering from the same institution in 1948.

APPOINTMENT BY NATIONAL SCIENCE FOUNDATION

Paul E. Klopsteg, Director of Research, Northwestern Institute of Technology, and Chairman of the National Research Council Advisory Committee on Artificial Limbs, has been appointed Assistant Director of the National Science Foundation for the Division of Physical, Mathematical, and Engineering Sciences. Dr. Klopsteg assumed his new duties with the Foundation on November 1.

Dr. Klopsteg has been long associated with the administration of research, serving with the Office of Scientific Research and Development during World War II. Since 1945, he has served as a member and chairman of the board of governors of the Argonne National Laboratory, operated by the University of Chicago.

NEW LIAISON REPRESENTATIVE

Mina S. Rees has been appointed Liaison Representative of the Office of Naval Research in the Division of Mathematics. During World War II, Dr. Rees was executive assistant to Warren Weaver, Chief of the Applied Mathematics Panel, National Defense Research Committee. For her work she received the King's Medal for Service in the Cause of Freedom from England and the President's Certificate of Merit from the United States. Later, Dr. Rees became Director of the Mathematical Sciences Division, Office of Naval Research. She is currently Navy Member and Chairman of the Applied Mathematics Advisory Council, National Bureau of Standards, and a member of the National Research Council Committee on High-Speed Computing Machines.

SCIENTIFIC PERSONNEL

MANPOWER POLICIES

While the past summer has seen relatively small Selective Service quotas, it has been pointed out in these columns that much larger quotas are to be expected. The Government is preparing for this expected development by further evolvement of Selective Service and other manpower policies, so that mobilization shall not weaken the national effort in activities requiring specialized personnel.

The Committee on Specialized Personnel of the Office of Defense Mobilization has been holding regular meetings looking towards the development of national policy relating to specialized personnel, and the Advisory Committees on Specialized Personnel of the Selective Service System have been scrutinizing very carefully the anticipated changes in Selective Service policies now in effect.

The present policy relating to student deferment will need to be adapted and modified, although the general principles now in effect are expected to hold.

M. H. Trytten, Director of the Office of Scientific Personnel of the National Research Council, is a member of the Committee on Specialized Personnel and General Chairman of the Advisory Committees on Specialized Personnel of the Selective Service System.

ENGINEERING MANPOWER PROBLEMS

The engineering profession has become seriously concerned over the rapidly diminishing enrollment in engineering schools which is taking place concurrently with increasing demands for technically trained personnel. To study this problem and to examine the implications for industry and the engineering profession and to alert the employers and the public to these implications, as well as implications for national security, the Engineers Joint Council established the Engineering Manpower Commission, which is financed by contributions from industry. This Commission has been in existence for something over a year.

To further the objectives of the Commission and to provide close liaison with the activities of the National Research Council Office of Scientific Personnel, the Engineering Manpower Commission makes an an-

nual contribution to the Research Council. The Director of the Office of Scientific Personnel serves as consultant to the Commission and attends its meetings.

NATIONAL RESEARCH FELLOWSHIPS IN THE NATURAL SCIENCES

The National Research Council announces the continuance of the National Research Fellowship program in the natural sciences for the year 1952–53. These fellowships, supported by the Rockefeller Foundation, are being offered for the thirty-third consecutive year.

Designed to promote fundamental research in the natural sciences, the fellowships are available in the fields of mathematics, astronomy, physics, chemistry, geology, geophysics, paleontology, physical geography, botany, zoology, biochemistry, biophysics, agriculture, forestry, anthropology, and psychology.

Applicants must be citizens of the United States or Canada, under thirty-five years of age, and must have completed all requirements for the doctorate prior to assuming a fellowship. There are also available to qualified applicants a limited number of participating fellowships. Applications for these are considered when a university is desirous of cooperating with the Fellowship Board by providing approximately a half-time instructorship in combination with a half-time research fellowship.

Fellowship awards are made for one year and will be announced at the annual meeting of the Fellowship Board on March 22, 1952. Applications must be on file in the Fellowship Office on or before January 1, 1952.

1951-52 FULBRIGHT PROGRAM

The Committee on International Exchange of Persons reports that a total of 357 travel grants under the Fulbright Program for 1951–52 have been made (85 for lecturing and 272 for advanced research), and approximately 45 additional applications are being reviewed.

Four new countries—Austria, Pakistan, Thailand, and Turkey—have established programs under the Fulbright Act during the past year. The distribution of scholars by all participating countries is as follows:

Australia	15	Italy	53
Austria	18	Netherlands	24
Belgium–Luxembourg	6	New Zealand	4
Burma	7	Norway	30
Egypt	13	Pakistan	4
France	28	Philippines	2
Greece	10	Turkey	5
India	20	United Kingdom	110
Iran	8	TOTAL	357

The 357 visiting scholars are affiliated with 96 different American institutions, 46 of which have not previously received scholars under the program. However, 48 percent of the total number of scholars are concentrated in 10 universities. A wider geographic distribution of the visitors thus remains one of the principal objectives of the program.

LILLY RESEARCH FELLOWSHIPS

The Lilly Research Laboratories have announced a number of postdoctoral fellowships in the natural sciences. The fields included are biochemistry, biophysics, botany, organic chemistry, physics, physiology, and zoology.

These fellowships, administered by the Lilly Research Laboratories Fellowship Board of the National Research Council, will be available to citizens of the United States who have met all the requirements for a Ph.D. degree before assuming their fellowships. The Board also requires that each applicant be nominated by a sponsor who is well acquainted with the applicant both personally and professionally.

The basic stipend is $3,300 per year, with larger stipends for married fellows with dependents. Additional allowance for necessary travel is available and $500 will be provided annually to the institution to which the fellow is assigned.

Appointments are for one year. All applications must be in the Fellowship Office by January 10, 1952, and awards will be made about April 1, 1952.

Additional information and application blanks may be secured from the Lilly Research Laboratories Fellowship Board, Fellowship Office, National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

One of the major activities of the Fellowship Office of the National Research Council is the evaluation of applications for fellowships authorized by the National Science Foundation Act of 1950.

Predoctoral and postdoctoral fellowships are available in mathematical, physical, medical, biological, and engineering sciences, and related fields. No awards will be made in clinical medicine, but medical students preparing for careers in medical research are eligible.

Predoctoral fellowships will be awarded to citizens of the United States who have demonstrated marked ability and aptitude for advanced study in the sciences, and who will be ready to begin or continue graduate training during the 1952–53 academic year. Awards will be based on scores made on tests of scientific aptitude and achievement, academic records, and recommendations.

To be considered for postdoctoral fellowships, candidates must have training equivalent to a Ph.D. or M.D. degree in one of the sciences listed above. Applications for both pre- and postdoctoral fellowships must be submitted to the Fellowship Office on or before January 7, 1952, and must be accompanied by the required affidavit and loyalty oath.

Appointments will be made for one year of study at accredited, non-profit institutions of higher education in the United States or similar foreign institutions. Institutions abroad must be approved by the National Science Foundation. Announcement of awards will be made in the spring by the National Science Foundation.

INTERNATIONAL RELATIONS

AUSTRALIAN SCIENTIFIC CONFERENCE

The first official conference of British Commonwealth scientific research organizations to be held outside the United Kingdom is scheduled for February 18 to March 7, 1952, in Canberra and Melbourne, Australia. The heads of all government research organizations in British Commonwealth countries have been invited to attend. Leaders in the fields of industrial, agricultural, and medical research will also be present to plan collaboration in civilian scientific work. The United States has been invited to send official observers to the conference.

FOOD ASPECTS OF CIVIL DEFENSE

L. A. Maynard, Director of the School of Nutrition, Cornell University, and Chairman of the Food and Nutrition Board of the National Research Council, served as a member of the United States delegation to the Joint United States, United Kingdom, Canadian Discussions on Administrative and Scientific Problems of Food Aspects of Civil Defense held in London, November 26–December 13. Among other members of the delegation were representatives of the Federal Civil Defense Administration, U. S. Public Health Service, Federal Security Agency, U. S. Department of Agriculture, and the American Red Cross.

SCIENTIFIC UNIONS

IUPAP

The Seventh General Assembly of the International Union of Pure and Applied Physics was held in Copenhagen, Denmark, July 11–13.

Preceding the Assembly, a stimulating colloquium on Problems of Quantum Physics was held from July 6 to 10 under the auspices of the Institute for Theoretical Physics, Copenhagen. This colloquium was another in the long series of "Bohr Conferences" which began in the early twenties almost as a family gathering of physicists. This year it was a much larger and more senior gathering than heretofore. The discussions centered around current problems of mesons, nuclear forces, nuclear structure, nuclear reactions, and field theory. The meeting concluded with a talk by Niels

Bohr on "Complementarity in Relation to Physics, Biology, and Sociology."

Delegations from 17 of the 25 adhering countries attended the General Assembly of the Union. The United States was represented by 10 official delegates. Reports and recommendations were presented by five Commissions of the Union, and a new Commission on Acoustics was established with R. H. Bolt, Massachusetts Institute of Technology, as President. It was recommended that a Joint Commission on the Solid State be established in cooperation with the International Union of Crystallography.

The following members of the Executive Committee of the Union were elected to serve for the next three years:

President, N. F. Mott (Great Britain); *Secretary,* P. Fleury (France).

Vice-Presidents: E. Amaldi (Italy), G. Borelius (Sweden), J. Heyrobsky (Czechoslovakia), P. Huber (Switzerland), K. S. Krishnan (India), M. L. Oliphant (Australia), J. C. Slater (U. S. A.), and J. A. Wheeler (U. S. A.).

Past Presidents: R. A. Millikan (U. S. A.), M. Siegbahn (Sweden), and H. A. Kramers (Netherlands).

I U Cr

The Second General Assembly of the International Union of Crystallography was held in Stockholm, Sweden, from June 27 through July 3. The Assembly was followed by two symposia held under the auspices of UNESCO on July 4 and 5. About 400 persons from 22 countries attended the meetings. Fifty-nine of these were from the United States of America.

From an official membership of only four countries (Canada, Great Britain, Norway, and the United States) at the time of the First Assembly of the Union in 1948, the number of countries officially adhering to the Union has now grown to eighteen. Voting delegates from seventeen of these countries attended the Stockholm Assembly. Other participants in the scientific sessions included observers from four non-adhering countries.

A total of 153 papers were read at the scientific sessions. These included a wide variety of topics related to research on solids. At the two UNESCO symposia 53 additional scientific papers were presented. These dealt with recent x-ray techniques for determining atomic positions in crystals and the molecular structure of gases.

The Assembly voted to hold the Third General Assembly of the Union in 1954 in some country on the continent of Europe, preference being expressed for either France or Holland. The following members of the Executive Committee were elected to serve through the next Assembly:

President: J. M. Bijovet (Netherlands).

Vice-Presidents: G. Hägg (Sweden) and J. Wyart (France).

General Secretary: R. C. Evans (Great Britain).

Editor: P. P. Ewald (U. S. A.).

Members: J. D. Bernal (Great Britain), K. S. Krishnan (India), E. Onorato (Italy), and A. L. Patterson (U. S. A.).

I G U

The United States Department of State has invited the Governments of more than sixty-five countries to be represented at the Eighth General Assembly of the International Geographical Union which will convene in Washington, D. C., August 8–15, 1952. The official invitations were transmitted in November of this year.

Plans for the General Assembly and the International Geographical Congress which will be held concurrently are well advanced and early registrations forecast a large attendance from overseas. To date the Academy–Council Committee which is in charge of preparations has received more than 300 registrations from 43 different countries, and each mail brings 4 or 5 additional applications.

Many of the registrations, especially from individuals in "soft currency" countries, are accompanied by requests for travel grants or opportunities to earn dollars by teaching or lecturing in this country. The organizing committee has already located visiting professorships or lecturing opportunities for approximately 15 of these persons and hopes to find similar positions for 20 or 30 more.

In addition the committee is raising funds with which to provide travel and subsistence grants for 100 to 150 visiting geographers. These grants will range in amount from $200 to $500 each.

INTERNATIONAL SCIENTIFIC MEETINGS, 1952

January

2–8 Indian Science Congress, *Calcutta*

March

6–8 International Mathematical Union, First General Assembly, *Rome*

April

15–18 Third International Congress of Legal Medicine and of Social Medicine, *Bern*

26– Sixth International Hydrographic Conference, *Monaco*

May

International Symposium on Desert Research, *Jerusalem*

Sixth International Congress of Comparative Pathology, *Madrid*

29 to June 7 International Conference on Large Electric High-Tension Systems, *Paris*

June

International Symposium on the Reactivity of Solids, *Göteborg*

10–13 Conference and Exhibition on "Instruments and Measurements," *Stockholm*

July

International Congress of Zootechnics, *Copenhagen*

Joint Commission on High Altitude Research Stations, *Colorado*

14–19 International Congress of Physical Medicine, *London*

19–26 Eleventh International Dental Congress, *London*

21–26 Tenth International Congress of Dermatology, *London*

22–28 Second International Congress of Biochemistry, *Paris*

25 to Aug. 4 Third Pan American Consultation on Geography, *Washington*

August

Conference on Bacteriophage, *Paris*

Joint Commission on the Ionosphere, *Canberra*

Tenth Conference of the International Union Against Tuberculosis, *Rio de Janeiro*

8–15 International Geographical Union, Eighth General Assembly, *Washington*

8–15 Seventeenth International Geographical Congress, *Washington*

11–21 International Scientific Radio Union, Tenth General Assembly, *Sydney*

15 to Sept. 15 Eighth International Congress of Applied Mechanics, *Istanbul*

17–23 Sixth International Grassland Congress, *State College, Pennsylvania*

25 to Sept. 1 Fourth Congress of the International Association for Bridge and Structural Engineering, *Cambridge* and *London*

25 to Sept. 2 International Union of Theoretical and Applied Mechanics, Second General Assembly, *Istanbul*

September

International Union for the Protection of Nature, Third General Assembly, *Caracas*

Joint Commission on Radiobiology, *Stockholm*

Joint Commission on Solar and Terrestrial Relationships, *Rome*

International Astronomical Union, Eighth General Assembly, *Rome*

1–6 Conference on Differentiation, *Stockholm*

1–8 Fourth International Congress of Anthropological and Ethnological Sciences, *Vienna*

3–15 World Power Conference, *Chicago*

4–9 Second International Congress on Analytical Chemistry, *Oxford*

4–16 Seventh International Congress of Photogrammetry, *Washington* and *Dayton*

8–12 Joint Commission on Spectroscopy, *Columbus*

8–15 Nineteenth International Geological Congress, *Algiers*

10–12 Second International Congress of Internal Medicine, *London*

30 Fourth Annual Meeting of the Executive Board, International Council of Scientific Unions, *Amsterdam*

October

Ninth Congress of the International Society of Urology, *New York City*

1–3 International Council of Scientific Unions, Seventh General Assembly, *Amsterdam*

INTERNATIONAL SYMPOSIUM

An International Symposium on the organization of scientific and industrial research was held in London, November 12–15, under the auspices of the Department of Scientific and Industrial Research. Representatives from the following countries were present: Austria, Belgium, Canada, Denmark, France, Germany, Great Britain, Greece, Ireland, Italy, the Netherlands, Norway, Sweden, Switzerland, and United States of America.

PAN AMERICAN UNION

The Pan American Union has announced the appointment of Cortes Pla, formerly professor of physics and Dean of the Faculty of Mathematical Sciences at the Universidad del Litoral, Rosario, Argentina, as Head of the Science and Technology Section of the Union. Dr. Pla will arrive in Washington early in January to assume his new duties.

CONSULTATION ON GEOGRAPHY

The United States Department of State has invited the governments of the Other American Republics to be represented at the Third Consultation on Geography of the Pan American Institute of Geography and History scheduled to be convened under the auspices of the Government of the United States at Washington, D. C., July 25 to August 4, 1952. The theme of the Consultation, as announced by the Organizing Committee, will be "Geographic Planning for Economic Development."

In accordance with the rules and regulations of the Commission on Geography, the sponsor of the Consultation, the program will be composed of five Sections in each of which a specific aspect of the theme will be considered. The five Sections are: *1*) Physical Geography and Biogeography; 2) Human Geography; 3) Regional Geography; *4*) Geography of the Americas; and 5) Teaching and Dissemination of Geographic Knowledge.

Between Consultations the action program of the Commission on Geography is entrusted to five permanent committees. These committees and their respective Chairmen are: Basic Natural Resources (not yet named); Settlement and Colonization, J. Wreford Watson (Canada); Land Classification and Use Survey, Preston E. James (U. S. A.); Geography of the Americas, Federico A. Daus (Argentina); Teaching and Methodology, Carlos M. Delgado de Carvalho (Brazil). Although these five permanent committees probably will not hold formal meetings during the Consultation, the subject matter of these committees will be given priority in the work of the Sections.

JOINT PACIFIC RESEARCH PROJECT

The Pacific Science Council reports the completion of plans for a cooperative program of typhoon research sponsored jointly by the U. S. Weather Bureau and Air Weather Service. The research will consist of special reconnaissance flights into typhoons at intermediate and high elevations, synchronized so that diurnal variations in data may be noted. One series of flights will be made into a small typhoon still in the developmental stage, and a second series into a fully mature storm. If the plan succeeds in collecting the data desired, scientists will be able to view in greater detail the true structure of the tropical cyclone.

INDIAN NATIONAL INSTITUTE OF SCIENCES

The new National Institute of Sciences of India was formally dedicated on October 7, with the opening of the headquarters building at New Delhi. The Institute, patterned after the Royal Society of London, has been functioning since 1948. One of the chief functions of the Institute is to advise the Government on the award of scholarships for research. It has assisted recently in the development of plans for the projected "Highland Laboratory" in the Himalayas for the study of astrophysical phenomena.

UNESCO ARID ZONE RESEARCH PROGRAM

UNESCO has announced the appointment of the following U. S. scientists to membership on Arid Zone Research Panels:

Arid Zone Hydrology and Hydrogeology: Walter C. Lowdermilk, U. S. Soil Conservation Service; Frank J. Veihmeyer, University of California at Davis; and Harold V. Peterson, U. S. Geological Survey.

Arid Zone Biology: Paul B. Sears, Oberlin College; Edward Graham, U. S. Soil Conservation Service; and Fritz W. Went, California Institute of Technology.

Arid Zone Climatology: Herbert Thom, U. S. Weather Bureau; Richard Joel Russell, Louisiana State University; and Albert E. Showalter, U. S. Weather Bureau.

SYMPOSIUM ON DESERT RESEARCH

The Research Council of Israel is organizing a Symposium on Desert Research to be held in Jerusalem in the spring of 1952. The Symposium will last about one week and will include excursions into the Negev, the arid zone in the south of Israel. The objective of the Symposium is to review the present state of desert research. Eminent specialists from a number of countries will be invited to present papers under the following five sections: Climate, soil, water, energy, and biology.

AFFILIATED SOCIETIES

This Department of NEWS REPORT is reserved for announcement of annual meetings, research programs, and other activities of societies which are affiliated with the NRC.

GEOLOGICAL SOCIETY OF AMERICA

The Geological Society of America held its 64th annual meeting in Detroit, November 8–10, with about 1,300 members present. T. S. Lovering, U. S. Geological Survey, who had been Acting President since the death of Chester Stock in December 1950, was elected President for the coming year.

A special feature of the meeting was a symposium on "The Distribution of Igneous Rocks in Space and Time," at which G. W. Tyrrell of Glasgow, Scotland, was the principal speaker.

Pentti Eskola of Helsinki, Finland, received the Penrose Medal, and Martin J. Buerger, Massachusetts Institute of Technology, was the recipient of the A. L. Day Medal. A new award by the Mineralogical Society of America for outstanding research by an individual under 35 years of age was given to O. F. Tuttle of the Geophysical Laboratory, Carnegie Institution of Washington.

In conjunction with the Geological Society, the following affiliated societies held their annual meetings: The Paleontological Society, the Mineralogical Society of America, the Society of Economic Geologists, and the Society of Vertebrate Paleontology.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

The annual meeting of the American Institute of Chemical Engineers will be held in Atlantic City, December 2–5. Highlights of the technical program will include symposia on Industrial Waste Disposal, Chemical Engineering Fundamentals, and Opportunities in Chemical Marketing for Chemical Engineers.

AAAS

The American Association for the Advancement of Science will hold its annual meeting at Philadelphia, December 26–31. All 18 sections and subsections of the Association will have scheduled programs, and 71 other organizations will participate in the meeting.

More than a third of the sessions are being sponsored by two or more organizations, and many of them go far beyond the boundaries of a single discipline. The general symposia on Soviet Science and on Operation Knowledge, as well as the Conference on Scientific Manpower, are in this category. In addition there are 36 sectional symposia, apart from several being sponsored by the 71 participating organizations.

Among the highlights of the meeting are the following special lectures:

Wednesday Evening, December 26—"Animal Light" by E. Newton Harvey, speaking under the auspices of Sigma Xi.

Thursday Evening, December 27—"The Human Element in Industrial Research" by E. W. Engstrom, speaking for the Scientific Research Society of America.

Friday Evening, December 28—"Man's Synthetic Future" by Roger Adams, retiring president of AAAS.

Saturday Evening, December 29—"The Foundation of Freedom" by Arthur H. Compton, speaking under the auspices of the United Chapters of Phi Beta Kappa.

Sunday Evening, December 30—"Our National Resources of Skill and Wisdom" by C. W. de Kiewiet, President of the University of Rochester, speaking for the Honor Society of Phi Kappa Phi.

Arrangements for the complicated series of events at Philadelphia have been made by an energetic and resourceful committee, headed by Edward Hopkinson, Jr., Drexel and Co., *Honorary General Chairman*, and James Creese, President of Drexel Institute of Technology, *General Chairman*.

AMERICAN METEOROLOGICAL SOCIETY

The Council of the American Meteorological Society has issued a statement on the legislative aspects of weather modification. The views of the Council may be summarized as follows: *1*) Initial regulatory legislation should be on a rather modest scale and should be designed to protect the public and to foster further advances in scientific knowledge; *2*) Federal rather than State legislation should be passed because the resultant centralization of controls and information will favor a more rapid and orderly increase in scientific knowledge of weather modification and control; *3*) a licensing system administered by a single Federal agency should be established to insure a reasonable degree of control of operations and to protect the public from unqualified operators; *4*) the licensing authority should have the right to and should be charged with the collection of such data as the time, place, and purpose of each attempt at weather modification, the means and active agent employed, and the results observed; 5) many more carefully controlled experiments must be undertaken before it will be possible to determine to what extent it is possible to modify or control the weather.

AMERICAN GEOLOGICAL INSTITUTE

The Board of Directors of the American Geological Institute has announced the election of the following officers of the Institute for the coming year: Carey Croneis, President of Beloit College, *President;* Joseph L. Gillson, E. I. du Pont de Nemours Co., *Vice-President;* and Harry S. Ladd, U. S. Geological Survey, *Secretary-treasurer.*

THE CALENDAR

The following Academy–Research Council meetings will be held in Washington unless otherwise indicated. Attendance is restricted to members and invited guests except when meetings are announced as open to the public.

December

1	Chairmen of Advisory Selection Committees on Fulbright Awards
	Annual Meeting, Division of Chemistry and Chemical Technology
	Advisory Committee, Chemical-Biological Coordination Center
	Committee on Developmental Biology
3	Executive Committee, Committee on Handbook of Biological Data
5	Committee on Associates, American Institute of Biological Sciences, *Princeton, N. J.*
	Subcommittee on Sterilization of Blood and Plasma
6	Conference on Disaster Studies
7	Annual Meeting, Pacific Science Board
	Subcommittee on Acceptance, Advisory Board on Quartermaster Research and Development
7–8	Committee on Pathology
	Conference on Clinical Evaluation of Therapeutic Vitamin Mixtures
	Commission on Human Resources and Advanced Training
8–9	Conference on Insect Physiology, *Cincinnati, Ohio*
10	Conference on Organization of Agricultural Research Institute
12	Subcommittee on Burns
12–13	Electrolytic Grinding Panel
14–17	Committee on Growth
18	Nickel Panel
21	Committee on International Exchange of Persons
28	Subcommittee on Malaria

January

4	Committee on International Exchange of Persons
7	Committee on Drug Addiction and Narcotics
11	Committee on Sanitary Engineering and Environment
	Committee on Cancer Diagnosis and Therapy
14–18	Committees of the Highway Research Board
15–18	Annual Meeting, Highway Research Board
19	Committee on Growth
23	Subcommittee on Blood Coagulation
25	Subcommittee on Oncology
30	Subcommittee on Sterilization of Whole Blood and Plasma

RECORD OF MEETINGS

October

1 Ad Hoc Conference on Manual Methods of Artificial Respiration
Special Committee, Joint Conference on Proposed Road Tests
1–2 Nickel Panel
2 Subcommittee on Dermatology
Metallurgical Advisory Board
4 Committee on Globes
Executive Committee, Agricultural Board, *Chicago, Ill.*
5 Special Committee, Joint Conference on Proposed Road Tests
Subcommittee on Oncology
Advisory Group on Plumbing for Defense Production Administration Project
Ad Hoc Coral Atoll Advisory Committee
6 Committee on Surgery
7 Council, National Academy of Sciences, and Executive Board, National Research Council
8 Committee on Developmental Biology
8–9 Committee on UNESCO
10 Committee on Publications, American Institute of Biological Sciences
11 Editorial Board, American Institute of Biological Sciences Bulletin
12 Committee on Cancer Diagnosis and Therapy
Subcommittee on Malaria
13 Ad Hoc Committee on Aviation Psychology
15–16 Subcommittee on Fruits and Vegetables
15–19 Executive Board, International Council of Scientific Unions
16–17 Committee on Food Protection
17–18 Committee on Geography, Advisory to Office of Naval Research
17–19 Pumping Committee, *Springfield, Ill.*
19 Advisory Group on Radiobiology, Defense Production Administration Project
Subcommittee on Radiobiology
Committee on Definition and Standards for Foods, *New York*
19–20 Advisory Committee on Biology, American Institute of Biological Sciences
20 Subcommittee on Biochemistry
Subcommittee on Biology
Subcommittee on Clinical Investigation
Subcommittee on Etiology and Pathology
Committee on Dentistry
21 Ad Hoc Committee on International Union against Cancer
22 Ad Hoc Steering Committee on Insect Physiology
23 Subcommittee on Infectious Diseases and Chemotherapy
23 Committee on Codification, Ciphering and Punched-Card Techniques
24 Sponsors Meeting, Chemical-Biological Coordination Center
Steering Committee, Chemical-Biological Coordination Center
25 Advisory Committee on Hazards of Ammonium Nitrate Transportation
Subcommittee on Burns
26 Subcommittee on Tuberculosis
Committee on International Relations in Anthropology
Committee on Preservation of Indigenous Strains of Maize
29 Executive Committee, Committee on Growth
29–31 Conference on Electrical Insulation

November

1 Committee on Medicine
1–2 Advisory Committee on Biochemistry, American Institute of Biological Sciences
2 Committee on Milk Production, Distribution and Quality, *Ithaca, N. Y.*
3 Microbiological Culture Conference
5 Ad Hoc Committee on Stress
Steering Committee, Defense Production Administration Project
5–7 National Academy of Sciences, Yale University, *New Haven, Conn.*
6–7 Board of Directors, American Geological Institute, *Detroit, Mich.*
7 Committee on Geophysics, Advisory to Office of Naval Research, *Detroit, Mich.*
8 Committee on Nutrition Surveys
Subcommittee on Nutrition
9 Subcommittee on Organic Nomenclature, *Detroit, Mich.*
9–10 Food and Nutrition Board
10 Committee on Review Articles in Geology and Geophysics, *Detroit, Mich.*
Subcommittee on Handbook of Biological Data
12 Executive Committee, Building Research Advisory Board
Committee on Tropical Housing and Building Research
Subcommittee on Orthopedic Surgery
13 Subcommittee on Blood Coagulation
Building Research Advisory Board
14 Subcommittee on Shock
15 Subcommittee on the Nervous System
16–17 Subcommittee on the Penetration of Charged Particles in Matter, *Ithaca, N. Y.*

November

19 Subcommittee on Waste Disposal
Subcommittee on Food Supply
Subcommittee on Cereal and Baked Products

20 Subcommittee on General Products

21 Committee on Atomic Casualties

23 Committee on Problems of Alcohol

23–24 Committee on Archaeological Terminology, *Philadelphia, Pa.*

24 Committee on Surgery

24–25 Committee on Animal Nutrition, *Chicago, Ill.*

26 Committee on Psychiatry

27–28 Joint Conference on Laboratory Design for Handling Radioactive Materials

28 Executive Committee, Metallurgical Advisory Board

29 Executive Committee, Division of Medical Sciences
Committee on Veterans Medical Problems

30 Advisory Selection Committee on Fulbright Awards (Biology)
Advisory Selection Committee on Fulbright Awards (Mathematics)
Advisory Selection Committee on Fulbright Awards (Physics)
Policy Committee, Division of International Relations
Titanium Panel

NEW PUBLICATIONS

Atlas of Tumor Pathology. Section V, Fasc. 18, *Tumors of the Mediastinum,* by Hans George Schlumberger, 88 p., $0.75; Section IX, Fasc. 34, *Tumors of the Breast,* by Fred W. Stewart, 114 p., $1.10. Washington, D. C., American Registry of Pathology, Armed Forces Institute of Pathology, 1951.

Atoll Research Bulletin. Pacific Science Board. National Research Council. Nos. 3 and 4, Oct. 15, 1951; Nos. 5, 6, and 7, Nov. 15, 1951.

Digest of Literature on Dielectrics, Volume XIV–1950. National Research Council Publication 202, 1951. 230 p. $3.00.

Fourth Annual Report, Pacific Science Board, 1950. National Research Council, 1951. 114 p.

Glossary of Terms in Nuclear Science and Technology. Section VII, *Instrumentation,* 15, xviii p. $1.00; VIII, *Isotopes Separation* and IX, *Metallurgy,* 10, xx p. $1.20. New York, American Society of Mechanical Engineers, 1951.

Grammar and Vocabulary of the Language of Sonsorol-Tobi; Final Report of A. Capell. Pacific Science Board, National Research Council. 152 p. 1951.

GUTENBERG, B. *Internal Constitution of the Earth.* 2nd rev. ed. of Vol. VII, Physics of the Earth. New York, Dover Publications, Inc., 1951. 439 p. $6.00.

Landslides, a Selected Annotated Bibliography. Compiled by Jessie M. Tompkin and Severine H. Britt. Highway Research Board Bibliography No. 10. National Research Council, 1951. 59 p. $0.90.

Load Carrying Capacity of Roads as Affected by Frost Action. Highway Research Board Bulletin No. 40. National Research Council, 1951. 42 p. $0.75.

Precasting Highway Bridges and Structures. Highway Research Board Bulletin No. 39. National Research Council, 1951. 20 p. $0.45.

Proceedings, Wrightsville Beach Marine Conference. National Research Council Publication 203, 1951. 65 p. $0.50.

Report of the Ad Hoc Committee on Fluoridation of Water Supplies. National Research Council, 1951. 9 p.

Report of Committee on Roadside Development. Highway Research Board, National Research Council, 1951. 112 p. $1.50.

Report of the Committee on a Treatise on Marine Ecology and Paleoecology, 1950–51. No. 11. National Research Council, 1951. 83 p. $1.00.

Research and Development Personnel in Industrial Laboratories–1950. Report of the National Academy of Sciences–National Research Council to the National Scientific Register, U. S. Office of Education, May 1951. Washington, U. S. Office of Education, 1951. 13 p.

Study of the Disposal of Chemical Waste at Sea. National Research Council Publication 201, 1951. 49 p. $1.00.

Summary Tables of Biological Tests. Index to Volumes 1 and 2. National Research Council, 1951. 116 p. $1.00.

Summary Tables of Biological Tests. Vol. 3, nos. 4 and 5, August, October 1951. National Research Council.

Traffic Surveys by Post Cards. Highway Research Board Bulletin No. 41. National Research Council, 1951. 30 p. $0.45.

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NATIONAL RESEARCH COUNCIL

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The search for Truth is in one way hard and in another easy. For it is evident that no one can master it fully nor miss it wholly. But each adds a little to our knowledge of Nature, and from all the facts assembled there arises a certain grandeur.

—ARISTOTLE

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